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Microcontrollers

Module 5: Project



PREPARED BY

**Academic Services Unit**

April 2012

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Module 5: Project

**Module Objectives**

Upon successful completion of this module, students will be able to:

1. Analyse the expected project outcome, and design and construct a control circuit for the stated application.
2. Test the operation of the circuit.
3. Write a control program, download it onto the BASIC Stamp microcontroller and test its operation.
4. Demonstrate generic competencies such as teamwork, time management, documention and presentation skills through their project work and presentation.

**Module Contents:**

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**5.1 Project Guidelines**

Students are required to choose from the projects listed as project examples under section 7.2. Any other project that includes the concepts covered in the Microcontroller course could be considered by consulting the subject teacher. For any project chosen, the students are required to prepare a project report or a PowerPoint presentation in the formatspecified under section 7.3

**5.2Project Examples**

**Example-I: Traffic Light System for a T-Junction**

Design and build a Traffic Light system for one street at a ***T-Junction,*** using the Basic Stamp Board of Education.



**Procedure**

***Step-1:***

* The light should start initially in the Red state and remain Red for 5 seconds.
* The countdown of the number of seconds from 4 to 0 should be displayed on the 7-segment display.

***Step-2:***

The green light should turn ON immediately during the 0th second, and remain ON for 10 seconds allowing the cars to pass.

***Step-3:***

The light should turn then turn yellow, and remain in that state for 3 seconds after which the light should turn Red along with the display of seconds.

**Example-II: Traffic Light System for a 4-way Street**

Design and build a 4-way Traffic Light system using the Basic Stamp Board of Education.

Street A

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**[](http://images.google.ae/imgres?imgurl=http://www2.dystar.com/images/VIS4A_Traffic-light.jpg&imgrefurl=http://www2.dystar.com/highlights/econfidence.cfm?CFID=3371&CFTOKEN=81892524&usg=__9L6YU7oGXo69ngvTe2eNU69FOZ4=&h=270&w=282&sz=12&hl=ar&start=55&um=1&tbnid=LF3xBbGs87meTM:&tbnh=109&tbnw=114&prev=/images?q=traffic+light&start=54&ndsp=18&um=1&hl=ar&sa=N)**

R4

Y4

G4

G1 Y1 R1

Street D

Street B

**[](http://images.google.ae/imgres?imgurl=http://www2.dystar.com/images/VIS4A_Traffic-light.jpg&imgrefurl=http://www2.dystar.com/highlights/econfidence.cfm?CFID=3371&CFTOKEN=81892524&usg=__9L6YU7oGXo69ngvTe2eNU69FOZ4=&h=270&w=282&sz=12&hl=ar&start=55&um=1&tbnid=LF3xBbGs87meTM:&tbnh=109&tbnw=114&prev=/images?q=traffic+light&start=54&ndsp=18&um=1&hl=ar&sa=N)**

R2

Y2

G2

G3 Y3 R3

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Street C

**Procedure**

The traffic light for each street should follow the sequence described below:

***Step-1***

RED LED ON for 5 seconds --- GREEN OFF ----YELLOW OFF

***Step-2***

GREEN LED ON for 5 seconds --- RED OFF ----YELLOW OFF

***Step-3***

GREEN LED Blinks twice with 0.25 second ON and 0.25 second OFF each time.

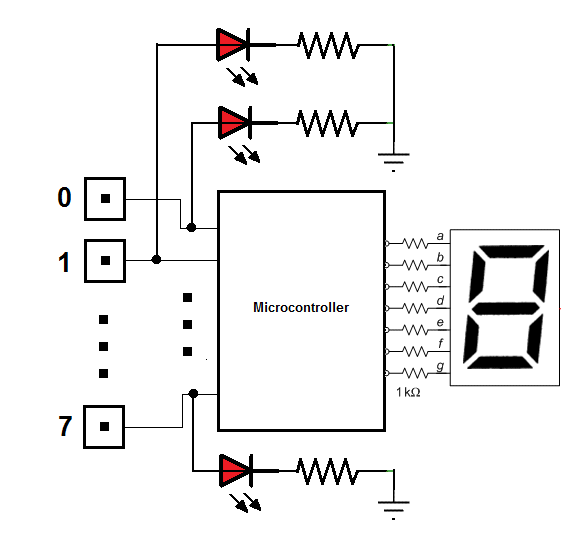
***Step-4***

YELLOW LED ON for 1 sec ---- GREEN OFF ----RED OFF

The required traffic light sequence for the entire system is given below:

**Example-III: Seven Segment Display**

Build a Seven Segment Display circuit on the BASIC Stamp Board of Education, and implement a program that can display numbers from 0 to 7 on the Seven SegmentDisplay. These numbers need to be displayed selectively using eight push button switches which are connected to the LED circuit to indicate each switch status as shown in the figure below.



**5.3 Project Report Format**

Prepare a project report in the format specified below OR prepare a PowerPoint presentation including the contents specified in the report format.

**PROJECT REPORT**

**Project title:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Student Names: 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Subject: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Section: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Objective**

*State the aim of this project.*

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**Project Description**

*Describe the project in your own words.*

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**HARDWARE**

**Circuit Diagram**

*Draw the schematic diagram.*

*Write the number of inputs and outputs.*

No of inputs: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

No of outputs: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Project Pictures**

**SOFTWARE**

**Flowchart:**

*Draw the flowchart for your control system*

**Program:**

*Write the program, download and test.*

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**Conclusion:**

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**5.4 Project Evaluation Rubric & Score-sheet**

The following rubric will be used to evaluate your project work:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Below Average | Satisfactory | Excellent | Score |
| Knowledge | 1,2,3 | 4,5,6 | 7,9, 10 |  |
| Time-management | 1,2,3 | 4,5,6 | 7,9, 10 |  |
| Teamwork | 1,2,3 | 4,5,6 | 7,9, 10 |  |
| CircuitBuilding, Program & Testing | 1,2,3 | 4,5,6 | 7,9, 10 |  |
| Project Report (contents & format) | 1,2,3 | 4,5,6 | 7,9, 10 |  |
| Total Score: | | | |  |